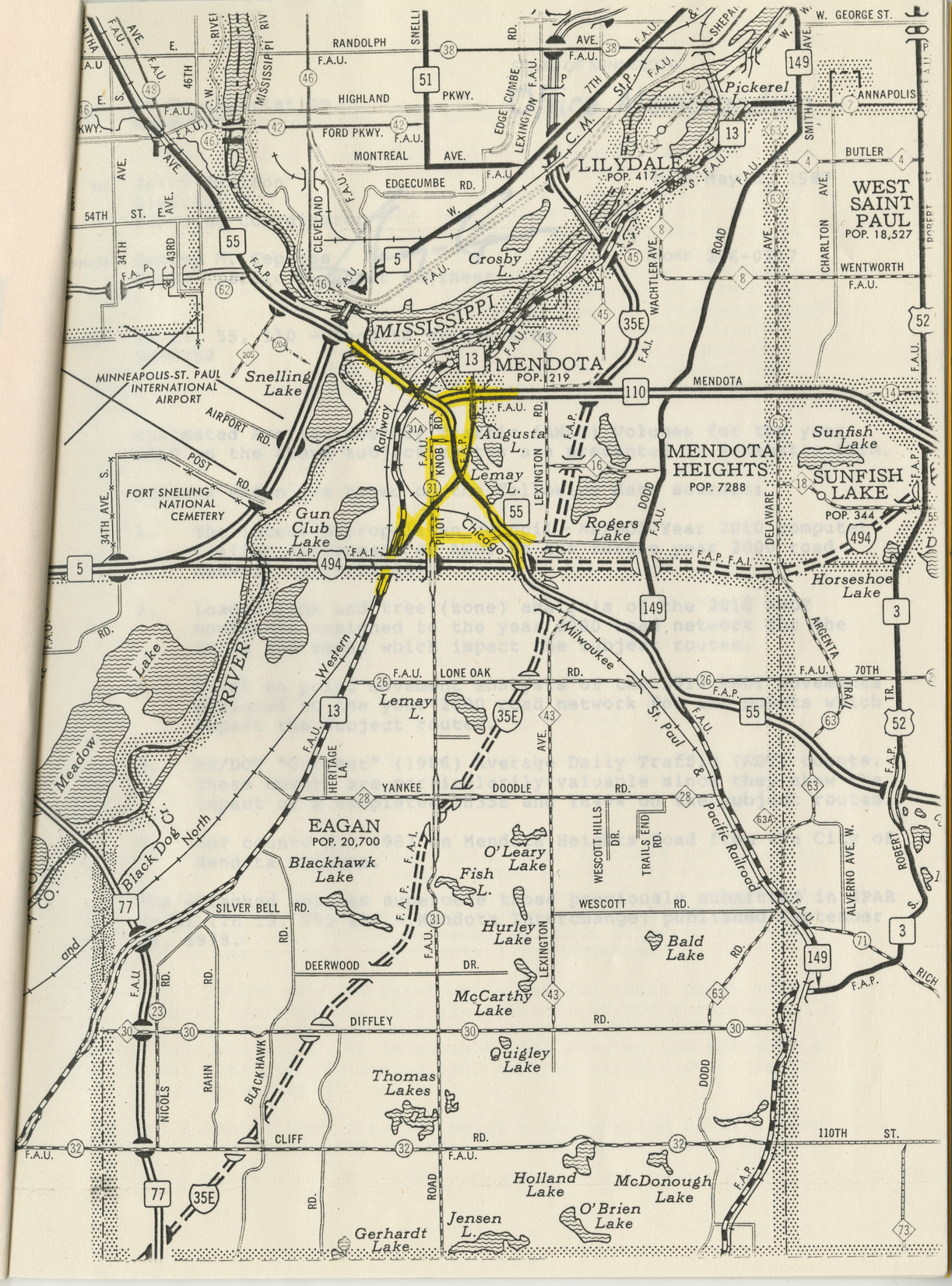
Transportation Analysis

TA-M352

T.H. 13, 55, 110 - Mendota Bridge Area

PREPARED BY
THE MINNESOTA DEPARTMENT OF TRANSPORTATION
PROGRAM MANAGEMENT DIVISION
TRAFFIC FORECASTS SECTION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RANDOLPH
HIGHLAND
FORD PKWY.
MONTREAL AVE.
EDGECUMBE RD.
54TH ST. E.
MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT
AIRPORT RD.
POST RD.
FORT SNELLING NATIONAL CEMETERY
Snelling Lake
MISSISSIPPI
Crosby L.
LILYDALE
POP. 417
Pickerel
WEST SAINT PAUL
POP. 18,527
ANNAPOLIS
BUTLER
WENTWORTH
MENDOTA
POP. 219
MENDOTA HEIGHTS
POP. 7288
Augusta L.
Lemay L.
Rogers Lake
Sunfish Lake
SUNFISH LAKE
POP. 344
Horseshoe Lake
Gun Club Lake
RIVER
Meadow Lake
Black Dog Cr.
LONE OAK RD.
70TH
YANKEE DOODLE RD.
EAGAN
POP. 20,700
Blackhawk Lake
O'Leary Lake
Fish L.
Hurley Lake
WESCOTT RD.
Bald Lake
SILVER BELL RD.
DEERWOOD DR.
McCarthy Lake
DIFFLEY RD.
Quigley Lake
Thomas Lakes
CLIFF RD.
110TH ST.
Holland Lake
McDonough Lake
O'Brien Lake
Jensen L.
Gerhardt Lake
St. Paul & Pacific Railroad
Milwaukee
Chicago
North Western Railway
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F.A.U.
F.A.P.
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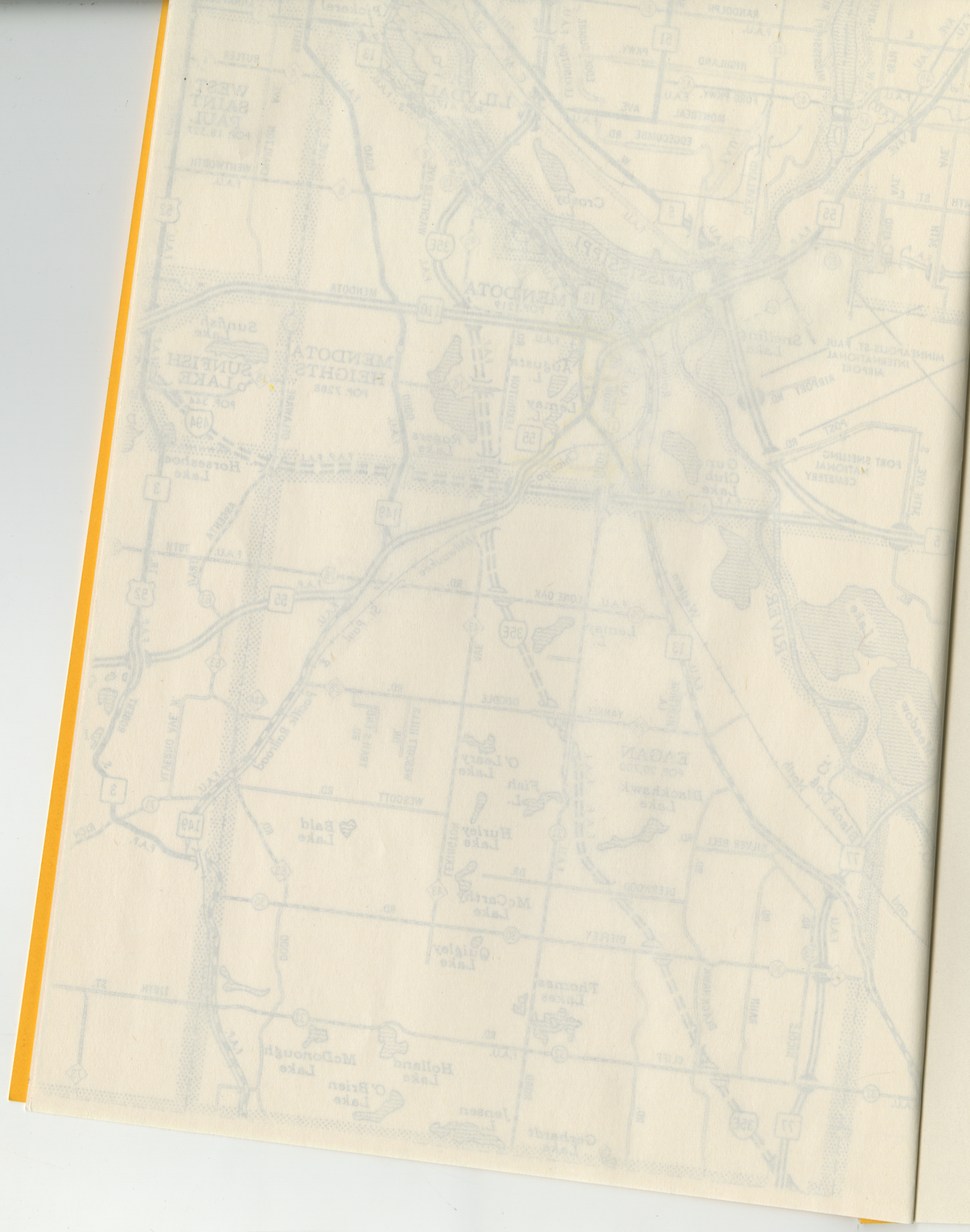


STATE OF MINNESOTA

Office Memorandum

ENT of Transportation
Room 820

TO: Jerry Skelton
District 9
Planning Coordinator

DATE: May 6, 1987

FROM: George M. Cepress
State Traffic Forecast Engineer

PHONE: 296-0217

BJECT: TH 13, 55, 110 - Mendota Bridge Area
TA-M352

Estimated Average Weekday Traffic (AWDT) Volumes for the year 2010 on the above subject routes are presented in schematic form.

Volumes shown are based on the following data sources:

1. The latest Metropolitan council - Mn/DOT Year 2010 computer traffic assignment of AWDT to the future year 2000 road network (2010/F2000).

2. Loaded link and tree (zone) analysis of the 2010 AWDT movements assigned to the year 2000 road network for the links and zones which impact the subject routes.

3. Point to point movement analysis of the 2010 AWDT movements assigned to the year 2000 road network for the points which impact the subject routes.

4. Mn/DOT "Current" (1986) Average Daily Traffic (ADT) counts. These counts are particularily valuable since they show the impact of a completed TH35E and TH494 on the subject routes.

5. ADT counts for 1983 on Mendota Heights Road from the City of Mendota Heights.

The attached volumes supercede those previously submitted in SPAR M-221 (TH 13, 55, 110 - Mendota Interchange) published September 26, 1978.

HEAVY COMMERCIAL AND ESAL FORECASTS

The following heavy commercial and ESAL forecasts for 2010 were made using information from current and historical vehicle class counts, the heavy commercial travel demand model and accompanying roadway network for 2010, and field observations taken during April of 1987. Perhaps the most significant features of these forecasts involve the major changes in traffic patterns throughout the general study area since the opening of I-494 and I-35E to St. Paul, and the increasing development of commercial land in the cities of Mendota Heights and Eagan. Previous HCADT and ESAL forecasts should be replaced with those contained in this document since data collected during 1986 were used as primary sources of vehicle type distribution information and should be considered more valid for use in forecasts than earlier counts.

Six forecasts were made on the different roadways involved in this project realigning TH 13 at TH 55 and TH 110. Segments were aggregated using similarities in forecast traffic characteristics. The segments are described below and their forecast ADT's are identified in Figure 1.

SEGMENT	DESCRIPTION
1	TH 55 between Mendota Bridge and the junction with TH 110
2	TH 110 between TH 55 and Lexington Avenue
3	TH 55 between TH 110 and I-494
4	New TH 13 between TH 55 and Old TH 13 on the north
5	New TH 13 between Mendota Heights Road and TH 55
6	CSAH 31 north of Mendota Heights Road

Figure 2 identifies the vehicle class count locations that were used in this forecast. Figures 3 through 8 contain forecast HCADT, TST's and ESAL's for the segments included in this forecast.

Segment 1 ESAL's were forecast using vehicle class county study 8, location 737 (or 8737) data. HCADT and vehicle class proportions of ADT were initially held constant between 1990 and 2010. Year 2010 HCADT was later increased to 7.1% of ADT to accomodate the anticipated increase in truck activity on roads leading to the bridge. See Figure 3 for worksheet.

Segment 2 ESAL's were forecast using vehicle class count 8738 since field observations indicated that fewer TST's should be allocated to TH 110 than would be allocated if vehicle class count 9880 was used. It is thought that many of the TST's that previously used TH 110 during 1982 are now using I-494. See Figure 4 for worksheet.

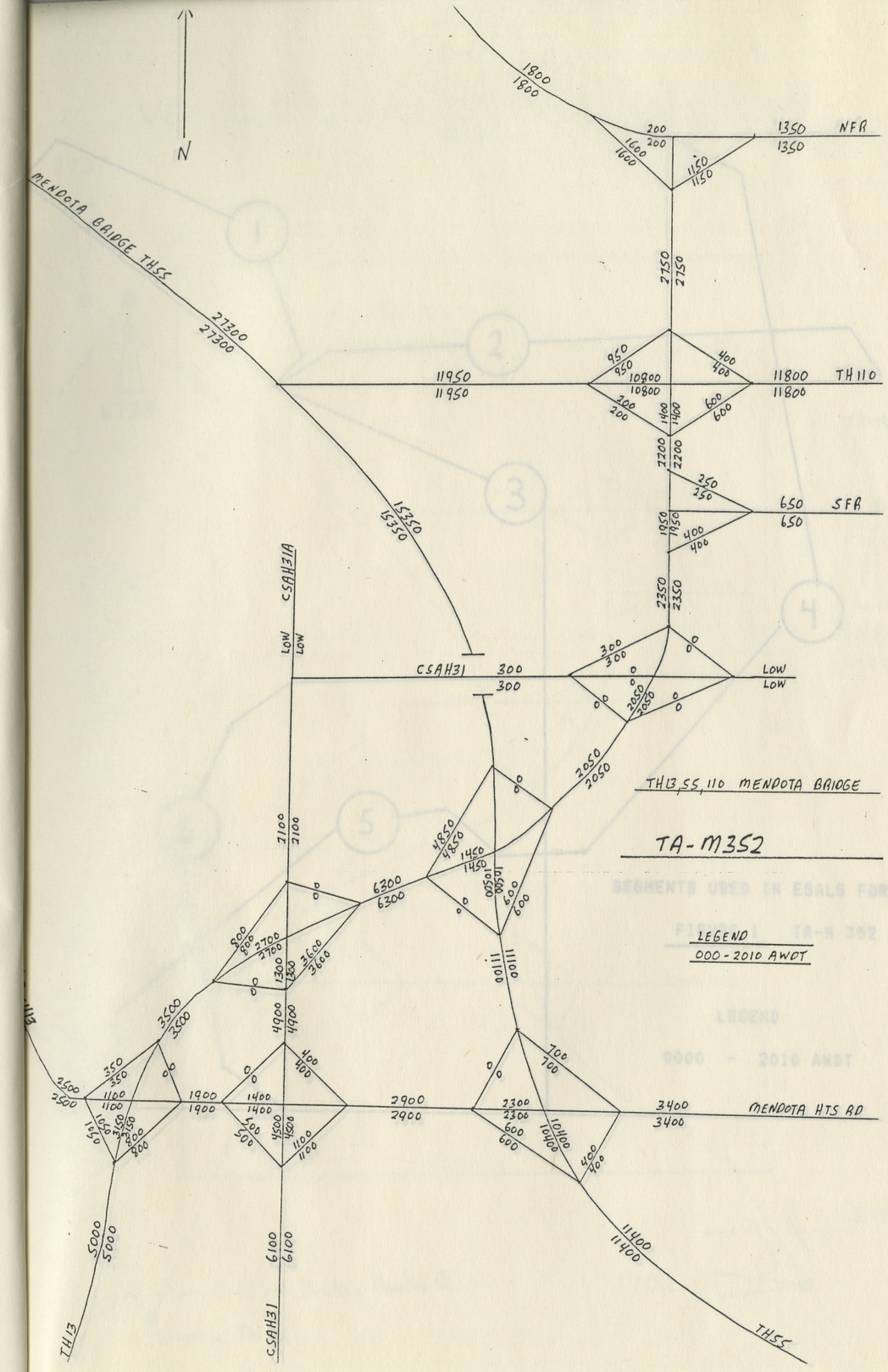
Segment 3 ESAL's were forecast using a combination of data from vehicle class count 1702 and observed turning movements between

TH 13 south of TH 55, and TH 55. Because it is expected that the strong turning movement between TH 55 and new TH 13 will occur between the north and west legs of the intersection, TH 55 between TH 110 and TH 13 was chosen as the forecast location for segment 3.

Given that there is no opportunity for south to east and east to south movement at the planned junction of TH 55 and TH 110, and that we assume a design-lane factor of .45 for both TH 55 and TH 110, the forecast ESAL's for segment 3 can be determined by subtracting segment 2 ESAL's from segment 1 ESAL's. See Figure 5 for worksheet.

Segment 4 ESAL's were forecast using vehicle class count 8734. Since there are fewer TST's relative to other traffic on TH 13, north of TH 55, than south of TH 55 today, TST's were more heavily assigned to new TH 13 (segment 5) in the forecast. See Figure 6 and 7 for worksheets.

Segment 6 ESAL's were forecast using the forecasts for the other segments, field observations and information from the Metropolitan Area Travel Demand Model. It is anticipated that the land served by CSAH 31 will be developed with more light industrial, warehouse and office uses since there is considerable development of that type there now and there is space for more. The forecasts for HCADT and ESAL's allow for moderate growth in the area served by CSAH 31. See Figure 8 for worksheet.


N
MENDOTA BRIDGE TH55
CSAH31
TH13
TH55
MENDOTA HTS RD
NFR
SFR
TH110
LOW
1800
1800
200
200
1600
1600
1350
1350
1150
1150
2750
2750
27300
27300
950
950
10900
10900
400
400
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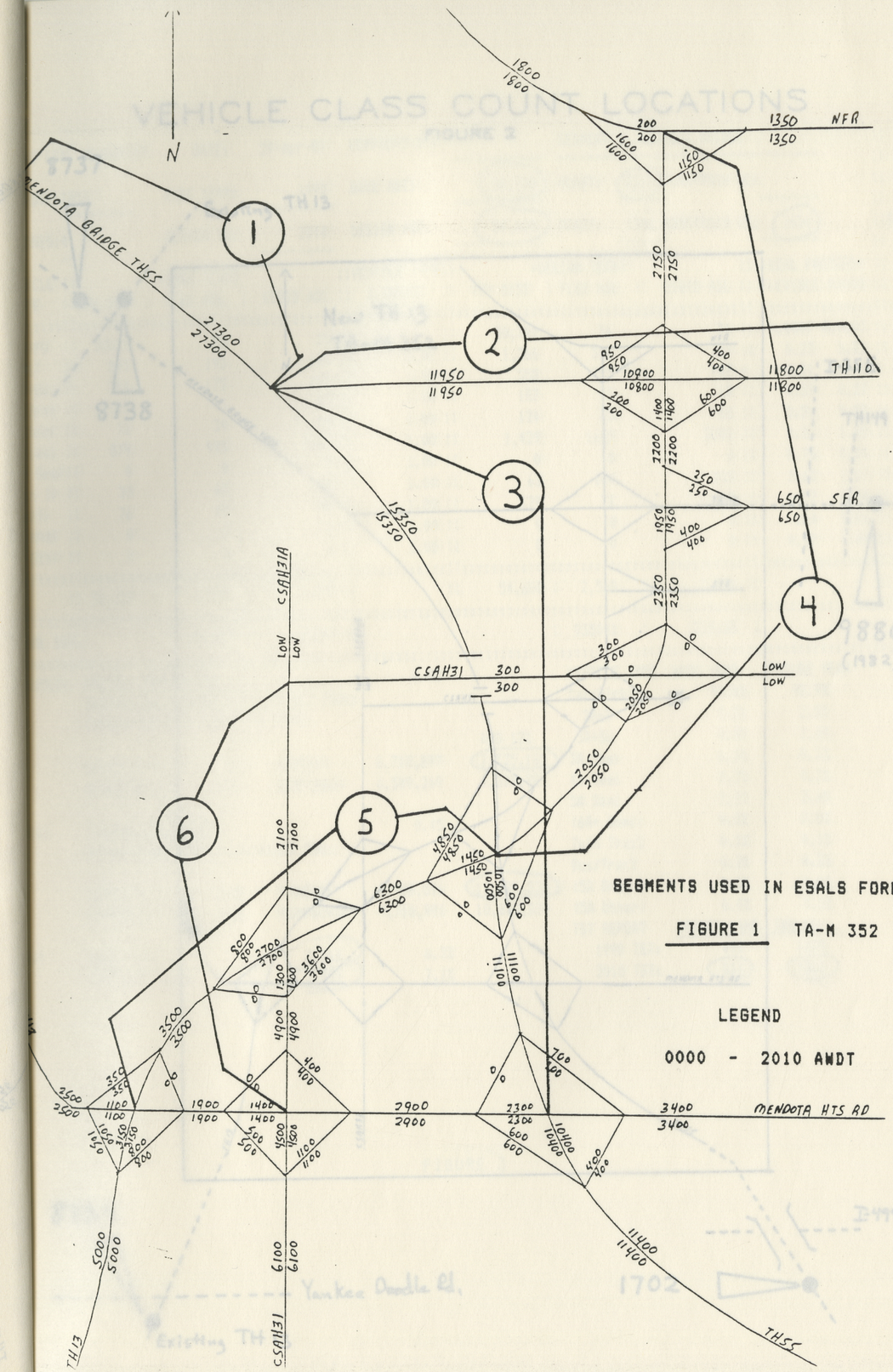
TH13,55,110 MENDOTA BRIDGE
TA-M352
LEGEND
000 - 2010 AWDT



SEGMENTS USED IN ESALS FORECAST

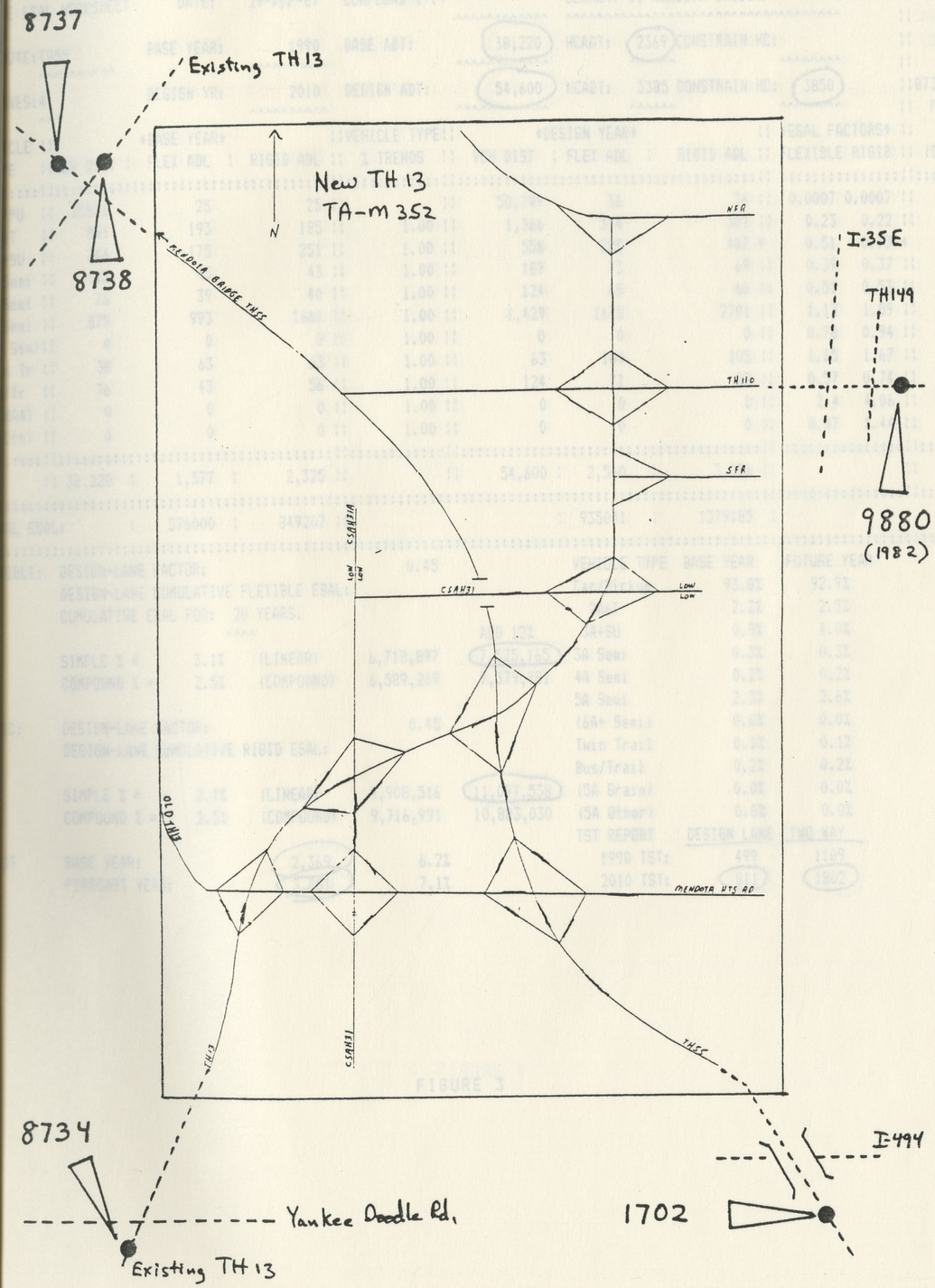
FIGURE 1 TA-M 352

LEGEND

0000 - 2010 AWDT

VEHICLE CLASS COUNT LOCATIONS

FIGURE 2



E ESAL WORKSHEET DATE: 29-Apr-87 COMPOUND % : SEGMENT 1, MENDOTA BRIDGE ;; COMMENTS

UTE:TH55 BASE YEAR: 1990 BASE ADT: 38,220 HCADT: 2369 CONSTRAIN HC: ;; VCC#

NES:4 DESIGN YR: 2010 DESIGN ADT: 54,600 HCADT: 3385 CONSTRAIN HC: 3850 ;;8737-1986

CLE E	VEH DIST	*BASE YEAR* FLEX ADL	RIGID ADL	VEHICLE TYPE % TRENDS	*DESIGN YEAR* VEH DIST	FLEX ADL	RIGID ADL	*ESAL FACTORS* FLEXIBLE	RIGID	PERCENT OF ADT (DECIMAL)
PU	35851	25	25	1.00	50,749	36	36	0.0007	0.0007	
T	841	193	185	1.00	1,366	314	301	0.23	0.22	2.2%
SU	344	175	251	1.00	558	285	407 *	0.51	0.73 *	0.9%
Semi	115	45	43	1.00	187	73	69	0.39	0.37	0.3%
Semi	76	39	40	1.00	124	63	66	0.51	0.53	0.2%
Semi	879	993	1661	1.00	1,429	1615	2701	1.13	1.89	2.3%
Sem)	0	0	0	1.00	0	0	0	0.78	0.94	
n Tr	38	63	63	1.00	63	104	105	1.65	1.67	0.1%
/Tr	76	43	56	1.00	124	71	92	0.57	0.74	0.2%
MAX)	0	0	0	1.00	0	0	0	2.4	4.06	
Oth)	0	0	0	1.00	0	0	0	0.87	1.44	
	38,220	1,577	2,325		54,600	2,560	3,776			6.2%
AL ESAL:		576000	849207				935041	1379185		

IBLE: DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE FLEXIBLE ESAL:

CUMULATIVE ESAL FOR: 20 YEARS.

				ADD 12%
SIMPLE % =	3.1%	(LINEAR)	6,718,897	7,525,165
COMPOUND % =	2.5%	(COMPOUND)	6,589,269	7,379,981

ID: DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE RIGID ESAL:

SIMPLE % =	3.1%	(LINEAR)	9,908,516	11,097,538
COMPOUND % =	2.5%	(COMPOUND)	9,716,991	10,883,030

DT BASE YEAR: 2,369 6.2%

FORECAST YEAR: 3,851 7.1%

VEHICLE TYPE	BASE YEAR	FUTURE YEAR
Car/Pickup	93.8%	92.9%
2A&T	2.2%	2.5%
3A+SU	0.9%	1.0%
3A Semi	0.3%	0.3%
4A Semi	0.2%	0.2%
5A Semi	2.3%	2.6%
(6A+ Semi)	0.0%	0.0%
Twin Trail	0.1%	0.1%
Bus/Trail	0.2%	0.2%
(5A Grain)	0.0%	0.0%
(5A Other)	0.0%	0.0%

TST REPORT	DESIGN LANE	TWO WAY
1990 TST:	499	1109
2010 TST:	811	1802

FIGURE 3

E ESAL WORKSHEET DATE: 29-Apr-87 COMPOUND % : SEGMENT 2, BETWEEN TH55 AND LEXINGTON AVE. COMMENTS

UTE:TH110 BASE YEAR: 1990 BASE ADT: 16,520 HCADT: 701 CONSTRAIN HC: MODIFIED LOC 8738-1986

NES:4 DESIGN YR: 2010 DESIGN ADT: 23,600 HCADT: 1000 CONSTRAIN HC: VCC#

CLE / E	*BASE YEAR* VEH DIST	FLEX ADL	RIGID ADL	VEHICLE TYPE % TRENDS	*DESIGN YEAR* VEH DIST	FLEX ADL	RIGID ADL	*ESAL FACTORS* FLEXIBLE	RIGID	PERCENT OF ADT (DECIMAL)
/PU	15819	11	11		22,600	16	16	0.0007	0.0007	
6T	363	83	80	1.00	519	119	114	0.23	0.22	2.2%
+SU	132	55	79	1.00	189	79	113	0.42	0.6	0.8%
Semi	17	7	6	1.00	24	9	9	0.39	0.37	0.1%
Semi	17	9	9	1.00	24	12	13	0.51	0.53	0.1%
Semi	132	149	249	1.00	188	212	355	1.13	1.89	0.8%
Sem)	0	0	0	1.00	0	0	0	0.78	0.94	
Tr	7	12	12	1.00	9	15	15	1.65	1.67	.0%
/Tr	33	19	24	1.00	47	27	35	0.57	0.74	0.2%
MAX)	0	0	0	1.00	0	0	0	2.4	4.06	
Oth)	0	0	0	1.00	0	0	0	0.87	1.44	
	16,520	345	471		23,600	490	670			4.2%
AL ESAL:		126012	172033			178973	244718			

IBLE: DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE FLEXIBLE ESAL:

CUMULATIVE ESAL FOR: 20 YEARS.

				ADD 12%
SIMPLE % =	2.1%	(LINEAR)	1,360,515	1,523,777
COMPOUND % =	1.8%	(COMPOUND)	1,346,642	1,508,239

ID: DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE RIGID ESAL:

SIMPLE % =	2.1%	(LINEAR)	1,859,027	2,082,110
COMPOUND % =	1.8%	(COMPOUND)	1,839,903	2,060,691

DT BASE YEAR: 701 4.2%

FORECAST YEAR: 1,000 4.2%

VEHICLE TYPE	BASE YEAR	FUTURE YEAR
Car/Pickup	95.8%	95.8%
2A6T	2.2%	2.2%
3A+SU	0.8%	0.8%
3A Semi	0.1%	0.1%
4A Semi	0.1%	0.1%
5A Semi	0.8%	0.8%
(6A+ Semi)	0.0%	0.0%
Twin Trail	.0%	.0%
Bus/Trail	0.2%	0.2%
(5A Grain)	0.0%	0.0%
(5A Other)	0.0%	0.0%

TST REPORT	DESIGN LANE	TWO WAY
1990 TST:	78	173
2010 TST:	110	244

FIGURE 4

SEGMENT 3, TH55 BETWEEN NEW TH13 AND TH110

ESAL FORECAST

FLEXIBLE
7,525,165 - 1,523,777 = 6,001,388
SEGMENT 1 - SEGMENT 2 = SEGMENT 3

RIGID
11,097,538 - 2,082,110 = 9,015,428
SEGMENT 1 - SEGMENT 2 = SEGMENT 3

HCADT AND TST FORECAST

	2way HCADT	2way TST	Design lane TST
2010	2850	1555	700

FIGURE 5

E ESAL WORKSHEET DATE: 29-Apr-87 COMPOUND % : SEGMENT 4, TH13 EAST OF TH55 TO OLD TH13 COMMENTS

DUTE:TH13 BASE YEAR: 1990 BASE ADT: 3,850 HCADT: 165 CONSTRAIN HC: VCC#

ANES:2 DESIGN YR: 2010 DESIGN ADT: 5,500 HCADT: 234 CONSTRAIN HC: 8738-1986

ICLE PE	*BASE YEAR* VEH DIST	FLEX ADL	RIGID ADL	VEHICLE TYPE % TRENDS	*DESIGN YEAR* VEH DIST	FLEX ADL	RIGID ADL	*ESAL FACTORS* FLEXIBLE	RIGID	PERCENT OF ADT (DECIMAL)
/PU	3685	3	3		5,266	4	4	0.0007	0.0007	
6T	85	20	19	1.00	121	28	27	0.23	0.22	2.2%
+SU	31	13	19	1.00	44	18	26	0.42	0.6	0.8%
Semi	4	2	1	1.00	6	2	2	0.39	0.37	0.1%
Semi	4	2	2	1.00	6	3	3	0.51	0.53	0.1%
Semi	31	35	59	1.00	44	50	83	1.13	1.89	0.8%
Sem)	0	0	0	1.00	0	0	0	0.78	0.94	
n Tr	2	3	3	1.00	2	3	3	1.65	1.67	.0%
/Tr	8	5	6	1.00	11	6	8	0.57	0.74	0.2%
MAX)	0	0	0	1.00	0	0	0	2.4	4.06	
Oth)	0	0	0	1.00	0	0	0	0.87	1.44	
	3,850	82	111		5,500	115	157			4.2%
AL ESAL:		29951	40543			42004	57345			

IBLE: DESIGN-LANE FACTOR: 0.5

DESIGN-LANE CUMULATIVE FLEXIBLE ESAL:

CUMULATIVE ESAL FOR: 20 YEARS.

				ADD 12%
SIMPLE % =	2.0%	(LINEAR)	356,763	399,574
COMPOUND % =	1.7%	(COMPOUND)	353,381	395,786

ID: DESIGN-LANE FACTOR: 0.5

DESIGN-LANE CUMULATIVE RIGID ESAL:

SIMPLE % =	2.1%	(LINEAR)	485,240	543,468
COMPOUND % =	1.7%	(COMPOUND)	480,407	538,056

DT BASE YEAR: 165 4.3%

FORECAST YEAR: 234 4.3%

VEHICLE TYPE	BASE YEAR	FUTURE YEAR
Car/Pickup	95.7%	95.7%
2A6T	2.2%	2.2%
3A+SU	0.8%	0.8%
3A Semi	0.1%	0.1%
4A Semi	0.1%	0.1%
5A Semi	0.8%	0.8%
(6A+ Semi)	0.0%	0.0%
Twin Trail	0.1%	.0%
Bus/Trail	0.2%	0.2%
(5A Grain)	0.0%	0.0%
(5A Other)	0.0%	0.0%

TST REPORT	DESIGN LANE	TWO WAY
1990 TST:	21	42
2010 TST:	29	58

FIGURE 6

E ESAL WORKSHEET DATE: 29-Apr-87 COMPOUND % : SEGMENT 5, N. OF MENDOTA HTS. RD. TO TH55 ;; COMMENTS

UTE:TH13 BASE YEAR: 1990 BASE ADT: 8,820 HCADT: 746 CONSTRAIN HC: ;;5 A SEMI % FOR THRU TRP

NES:4 DESIGN YR: 2010 DESIGN ADT: 12,600 HCADT: 1063 CONSTRAIN HC: 945 ;;8734-1986 PERCENT

CLE / E	VEH DIST	*BASE YEAR* FLEX ADL	RIGID ADL	VEHICLE TYPE % TRENDS	*DESIGN YEAR* VEH DIST	FLEX ADL	RIGID ADL	*ESAL FACTORS* FLEXIBLE	RIGID	OF ADT (DECIMAL)
PU	8074	6	6		11,656	8	8	0.0007	0.0007	
T	247	57	54	1.00	314	72	69	0.23	0.22	2.8%
SU	71	30	43	1.00	90	38	54	0.42	0.6	0.8%
emi	18	7	7	1.00	22	9	8	0.39	0.37	0.2%
emi	35	18	19	1.00	44	22	23	0.51	0.53	0.4%
emi	353	399	667	1.00	448	506	847	1.13	1.89	4.0%
Sem)	0	0	0	1.00	0	0	0	0.78	0.94	
Tr	4	7	7	1.00	4	7	7	1.65	1.67	.0%
Tr	18	10	13	1.00	22	13	16	0.57	0.74	0.2%
AX)	0	0	0	1.00	0	0	0	2.4	4.06	
th)	0	0	0	1.00	0	0	0	0.87	1.44	
	8,820	533	815		12,600	675	1,032			9.4%
L ESAL:		194679	297679			246544	376939			

BLE: DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE FLEXIBLE ESAL:

CUMULATIVE ESAL FOR: 20 YEARS.

				ADD 12%
SIMPLE % =	1.3%	(LINEAR)	1,973,834	2,210,694
COMPOUND % =	1.2%	(COMPOUND)	1,964,678	2,200,439

DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE RIGID ESAL:

SIMPLE % =	1.3%	(LINEAR)	3,017,947	3,380,100
COMPOUND % =	1.2%	(COMPOUND)	3,003,962	3,364,437

BASE YEAR:	746	8.5%
FORECAST YEAR:	944	7.5%

VEHICLE TYPE	BASE YEAR	FUTURE YEAR
Car/Pickup	91.5%	92.5%
2A&T	2.8%	2.5%
3A+SU	0.8%	0.7%
3A Semi	0.2%	0.2%
4A Semi	0.4%	0.3%
5A Semi	4.0%	3.6%
(6A+ Semi)	0.0%	0.0%
Twin Trail	.0%	.0%
Bus/Trail	0.2%	0.2%
(5A Grain)	0.0%	0.0%
(5A Other)	0.0%	0.0%

TST REPORT	DESIGN LANE	TWO WAY
1990 TST:	185	411
2010 TST:	233	518

FIGURE 7

RE ESAL WORKSHEET DATE: 29-Apr-87 COMPOUND % : SEGMENT 6, MENDOTA HTS.RD. TO NEW TH13

OUTE:CSAH31 BASE YEAR: 1990 BASE ADT: 6,860 HCADT: 353 CONSTRAIN HC:

ANES:4 DESIGN YR: 2010 DESIGN ADT: 9,800 HCADT: 504 CONSTRAIN HC:

ICLE PE	VEH DIST	*BASE YEAR* FLEX ADL	RIGID ADL	VEHICLE TYPE % TRENDS	*DESIGN YEAR* VEH DIST	FLEX ADL	RIGID ADL	*ESAL FACTORS* FLEXIBLE	RIGID	COMMENTS SOTP / VCC# / PERCENT OF ADT (DECIMAL)
/PU	6507	5	5		9,296	7	7	0.0007	0.0007	
6T	137	32	30	1.00	196	45	43	0.23	0.22	2.0%
+SU	55	23	33	1.00	78	33	47	0.42	0.6	0.8%
Semi	14	5	5	1.00	20	8	7	0.39	0.37	0.2%
Semi	27	14	14	1.00	39	20	21	0.51	0.53	0.4%
Semi	103	116	195	1.00	147	166	278	1.13	1.89	1.5%
Sem)	0	0	0	1.00	0	0	0	0.78	0.94	
n Tr	3	5	5	1.00	4	7	7	1.65	1.67	.0%
/Tr	14	8	10	1.00	20	11	15	0.57	0.74	0.2%
MAX)	0	0	0	1.00	0	0	0	2.4	4.06	
Oth)	0	0	0	1.00	0	0	0	0.87	1.44	
	6,860	208	297		9,800	296	424			5.1%
L ESAL:		75973	108480			108115	154867			

BLE: DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE FLEXIBLE ESAL:

CUMULATIVE ESAL FOR: 20 YEARS.

				ADD 12%
SIMPLE % =	2.1%	(LINEAR)	821,160	919,699
COMPOUND % =	1.8%	(COMPOUND)	812,693	910,216

D: DESIGN-LANE FACTOR: 0.45

DESIGN-LANE CUMULATIVE RIGID ESAL:

SIMPLE % =	2.1%	(LINEAR)	1,174,621	1,315,576
COMPOUND % =	1.8%	(COMPOUND)	1,162,293	1,301,768

BASE YEAR:	353	5.1%
FORECAST YEAR:	504	5.1%

VEHICLE TYPE	BASE YEAR	FUTURE YEAR
Car/Pickup	94.9%	94.9%
2A&T	2.0%	2.0%
3A+SU	0.8%	0.8%
3A Semi	0.2%	0.2%
4A Semi	0.4%	0.4%
5A Semi	1.5%	1.5%
(6A+ Semi)	0.0%	0.0%
Twin Trail	.0%	.0%
Bus/Trail	0.2%	0.2%
(5A Grain)	0.0%	0.0%
(5A Other)	0.0%	0.0%

TST REPORT	DESIGN LANE	TWO WAY
1990 TST:	66	147
2010 TST:	95	211

FIGURE 8